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| **20EE404**  **Hall Ticket Number:**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |      |  |  |  | | --- | --- | --- | | **II/IV B.Tech (Regular) DEGREE EXAMINATION** | | | | **August, 2022** | **Electrical and Electronics Engineering** | | | **Fourth Semester** | **Signals and Systems** | | | **Time: Three Hours** | | **Maximum:70 Marks** | | | | | | | |  |
| |  |  | | --- | --- | | *Answer question 1 compulsory.* | (14X1 = 14 Marks) | | *Answer one question from each unit.* | (4X14=56 Marks) | | | | | | | |  |
| 1. | a) | Define symmetric and asymmetric signals. | CO1 |  |
|  | b) | Define stability of a system. | CO1 |  |
|  | c) | Represent the signal x(n )={3,2,-1,0,6} in terms of weighted shifted impulse functions. | CO1 |  |
|  | d) | State any two properties of Linear Time Invariant Systems. | CO2 |  |
|  | e) | What is the significance in knowing magnitude spectra and phase spectra? | CO3 |  |
|  | f) | Define Convolution Integral. | CO2 |  |
|  | g) | What is the significance of ROC? | CO3 |  |
|  | h) | Explain Parsevals theorem for Fourier transforms. | CO3 |  |
|  | i) | Explain Duality property for continuous time Fourier transforms with an example. | CO3 |  |
|  | j) | Give the transfer function of First order hold. | CO3 |  |
|  | k) | How to reconstruct the original signal from its samples? | CO4 |  |
|  | l) | What is the Z-transform and ROC of x[n] = u[n] | CO3 |  |
|  | m) | Give the Fourier transform pair. | CO3 |  |
|  | n) | What is causality of a system? | CO2 |  |
| **Unit –I** | | | | |
| 2. | a) | Check whether the following systems are: i) Linear or non-linear ii) Static or dynamic iii) Causal or non-causal iv) Time-invariant or time-variant. | CO1 | 7M |
|  | b) | Examine whether each of the following sequences are periodic or not. If periodic, determine the fundamental period  i) ii) | CO1 | 7M |
| **(OR)** | | | | |
| 3. | a) | Determine whether the continuous time signal is periodic or not. If the signal is periodic, determine its fundamental period. | CO1 | 7M |
|  | b) | Determine the energy and power of the following signals.  i) ii) | CO1 | 7M |
| **Unit –II** | | | | |
| 4. | a) | Compute the convolution of the following pairs of signals, Where ‘\*’ denotes convolution.  , h | CO2 | 7M |
|  | b) | Explain briefly about the state space representation of systems and state transition matrix and its role. | CO2 | 7M |
| **(OR)** | | | | |
| 5. | a) | Determine whether the system described by the equation  with input x(t) and output y(t) is linear and/or time-invariant. | CO2 | 7M |
|  | b) | Find the equivalent impulse response when two systems represented by h1(n)=u(n) and h2(n)= + are in series. | CO2 | 7M |
| **Unit –III** | | | | |
| 6. | a) | Find the trigonometric and complex exponential Fourier series of the periodic waveform that is mathematically represented as | CO3 | 7M |
|  | b) | What is the difference between Discrete time Fourier Transform (DTFT) and Discrete Fourier Transform (DFT)? | CO3 | 7M |
| **(OR)** | | | | |
| 7. | a) | Explain and Derive Parseval’s relation in Z-transform. | CO3 | 7M |
|  | b) | Write the properties of ROC w.r.t. Z-transforms. | CO3 | 7M |
| **Unit –IV** | | | | |
| 8. | a) | Explain the representation of a continuous time signal by its samples and also mention the effects of under sampling. | CO4 | 7M |
|  | b) | Explain the application of Signal and System in communications for modulation. | CO4 | 7M |
| **(OR)** | | | | |
| 9. | a) | Derive the relation between Continuous time system and Discrete time system | CO4 | 7M |
|  | b) | What is Zero order hold. What is its significance? | CO4 | 7M |

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